

## Answer on Question#42679 – Math – Statistics and Probability

### Question:

A marketing manager makes the statement that the long-run probability that a customer would prefer the deluxe model to the standard model is 30%.

1.2.1 What is the probability that exactly 3 in a random sample of 10 customers will prefer the deluxe model? (3)

1.2.2 What is the probability that more than 2 in a random sample of 10 customers will refer the standard model?

### Solution.

The probability that a customer would prefer the deluxe model to the standard model is  $p=0.3$ .

We will use the Bernoulli scheme:

$$P(x = k) = C_n^k p^k (1 - p)^{n-k}$$

1.2.1 The probability that exactly 3 in a random sample of 10 customers will prefer the deluxe model is

$$P(x = 3) = C_{10}^3 (0.3)^3 (0.7)^7 = \frac{10!}{3!7!} * (0.3)^3 (0.7)^7 = 0.266827932$$

1.2.2 The probability that more than 2 in a random sample of 10 customers will prefer the standard model is  $P(x > 2) = 1 - P(x \leq 2) = 1 - P(x = 0) - P(x = 1) - P(x = 2) - P(x = 0)$ .

The probability that a customer would prefer the standard model is  $p=0.7$

$$P(x = 0) = C_{10}^0 0.7^0 (0.3)^{10} = 1 * 1 * (0.3)^{10} = 0.0000059049$$

$$P(x = 1) = C_{10}^1 0.7 (0.3)^9 = 10 * 0.7 (0.3)^9 = 0.000137781$$

$$P(x = 2) = C_{10}^2 (0.7)^2 (0.3)^8 = \frac{10!}{2! * 8!} (0.7)^2 (0.3)^8 = 0.0014467005$$

$$\begin{aligned} P(x > 2) &= 1 - P(x \leq 2) = 1 - P(x = 0) - P(x = 1) - P(x = 2) \\ &= 1 - 0,000137781 - 0,0014467005 - 0,0000059049 = 0,9984096136 \end{aligned}$$

**Answer.** 0,9984096136.